

(Under this application, which was originally made under Section 91 of the Patents and Designs Acts, 1907 to 1928, a specification was laid open to public inspection on May 10, 1928)

PATENT SPECIFICATION



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290,204

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COMPLETE SPECIFICATION.

Process and Device for the Reduction of the Nicotine Content of Raw Tobaccos, Semi-manufactured and Finished Tobacco Products.

(A communication from GENERAL-DIREKTION DER OESTERR. TABAKREGIE, Porzellangasse 51, Vienna IX, Austria, an Austrian Government Department.)

I, REGINALD EATON ELLIS, of the firm Mewburn, Ellis & Company, of 70/72, Chancery Lane, London, W.C. 2, a British Subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a process and device for the reduction of the nicotine content of raw tobaccos, semi-manufactured and finished tobacco products.

For removing the nicotine out of the tobaccos the present invention makes use of the well known principle of heating the tobacco while passing through it a current of air or steam. According to the present invention this process is carried out in such a manner as to eliminate all factors likely to have a retarding or unfavorable effect and to utilize all favourable conditions, so that the result desired is reached in a minimum of time notwithstanding the most careful treatment of the goods. By controlling the process in all its phases it is possible to warrant a predetermined degree of loss of nicotine, a feature not realized in any other process, as the work may be conducted so that the loss of nicotine is simply a function of time.

It has been shown by detailed investigations that by heating tobacco a quite small percentage only of nicotine is driven out together with the water vapour developed from the tobacco under the action of heat. A considerable reduction of the nicotine can, however, be obtained in a relatively short time if the moisture of tobacco is previously eliminated and a temperature of far above 100° C. is applied. At these temperatures the nicotine escapes owing to the dissociation of

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the nicotine salts chiefly present in the tobacco as malate, citrate etc. If carefully weighed quantities of nicotine salts are heated, perceptible weight losses cannot be observed before a temperature of 130° C. has been attained. As to larger quantities of these salts the spaces of time required for volatilizing at temperatures below 150° C. are far too long for practical use.

Since, in the tobacco, the nicotine salts are enclosed and protected in the cells, it will be necessary to apply still higher temperatures so as to ensure rapid dissociation and removal of the salts. It has been found that, when freeing tobacco from nicotine, considerable losses of nicotine will take place, within a time which practically can be considered, only with temperatures above 150° C.

That the volatility with steam, that is, of free nicotine, is actually of no importance in view of the final result may simply be deduced from the fact that the percentage of free nicotine contained in the tobacco is extremely low, whilst no other but free nicotine is volatile with steam. Nicotine chemically bound such as malate, citrate etc. is not at all volatile with steam whilst it is just under the form of the aforesaid salts that the nicotine is almost exclusively present in the tobacco.

On basis of these facts it is evident that in order to rapidly eliminate the nicotine to a high degree all factors must be made use of, tending to favour dissociation and to suppress all adverse influences acting against dissociation.

1). The tobacco submitted to the nicotine extracting process must be as dry as possible not only in order to avoid unnecessary losses of heat for evaporating the moisture, but especially because moist tobacco when heated is susceptible of being injured.

2). The tobacco must be heated as

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quickly as possible to the temperature required for dissociation, in order to prevent exposing it uselessly for a long time to a temperature, at which practically spoken no nicotine is driven off, whereby heat and time are saved and a deterioration of the tobacco is avoided.

3). The nicotine salts escaping must be removed from the tobacco surface as rapidly as possible, in order to facilitate the volatilization and dissociation of the nicotine salts contained in the tobacco.

4). The temperature in the interior of the apparatus must be the same throughout thus warranting a uniform extraction of the nicotine.

In compliance with the above particulars the process consists in rapidly heating the tobacco, which should be as dry as possible, to the critical temperature at which the nicotine salts will dissociate and volatilize. At the same time measures must be taken for the speedy removal of the nicotine salts as well as of the nicotine itself and the temperature must be kept throughout the apparatus on the same level.

By carrying out the process as set forth it is possible without deteriorating the quality of the tobacco to considerably reduce the percentage of nicotine in a relatively short time, the reduction amounting to 50—80% according to the duration of the treatment. As the temperature throughout the apparatus will be the same a uniform reduction of the contents of nicotine is warranted in the whole batch of tobacco. It is possible therefore to reduce e.g. the nicotine percentage of Virginia Cigars from 3% to 0.9% and of Portorico Cigars from 1.4% to 0.25%.

It has been proposed to free tobacco from nicotine by subjecting the tobacco to the action of a current of superheated steam having a temperature of 100—150° C., the steam and nicotine being passed through a condenser, while air or oxygen is excluded from the apparatus. This process has not furnished satisfactory results because a temperature below 130° C. is not sufficient to drive out and to dissociate the nicotine salts, furthermore rapid heating up to the required temperature is not provided finally because the tobacco is not treated in a dry state.

A rapid and reliable extraction of the nicotine is only possible by applying appropriate temperature and by simultaneously reducing the tension of the vapour developed from the tobacco as quickly as feasible, taking care of course to maintain the working conditions unaltered during the whole process.

For carrying out the process any appa-

ratus will suffice which is so constructed that it will permit to rapidly obtain a temperature above 150° C. and warrants the uniformity of temperature throughout the effective space of the apparatus, taking at the same time provision to enable the gases to pass rapidly and in uniform distribution through the device.

The accompanying drawings show an embodiment of such a nicotine extraction device; Fig. 1 representing a vertical section along the line A—B of Fig. 2 and Fig. 2 a cross section through the apparatus.

The wrought iron prismatic casing *a* of the apparatus is provided with insulating layers *b*, *c* consisting of a suitable material so that the interior is well protected against losses by heat radiation. At the smaller side of the casing *a*, there is provided an opening *d* through which the tobacco goods to be freed from nicotine are introduced, whereafter the said opening is closed by a door which is well isolated against losses by heat. The inner sides of the walls of the casing *a* are fitted with the supporting frames *e* screwed on, which take up the pans filled with tobacco one above the other. In order to obtain a perfectly uniform heating in the interior of the apparatus a horizontal hot water spiral *g* comprising several coils is located below each pan, a similar vertical hot water spiral *h* being arranged on the long sides of the casing, so that the contents of each pan is not only heated from below but also from aside. By thus locating the heating water pipes and by lining the casing *a* with the heat insulating layers *b*, *c* it has become possible to rapidly raise the temperature of the interior—and therefore also of the tobacco products to be treated—to the height required which can be observed and regulated during the whole extracting process by means of electric long-distance thermometers and thermostatic regulators (not shown in the drawing).

All hot water spirals belonging to a certain pan—are comprised in a group—being connected to the admission and return pipes of the heating water distribution system by means of shutting off devices, whereby two groups each of the heating water spirals lying one above each other are provided with connections located at opposite sides of the casing. The gas and air current required to remove the nicotine salts escaping is arranged to flow upwards in the direction of the longitudinal axis of the casing *a*. For the purpose of accurately regulating the air distribution in the interior of the apparatus, an adjustable and slitted sheet *i* is

fastened to the bottom of the casing *a* under the heating water spiral of the lowest pan which spiral is arranged in three planes. On the top of the apparatus there is located an exhaust pipe *j* provided with an adjustable regulating flap valve permitting the discharge of the air or the gases carrying the nicotine salts. Of course electric energy may be used instead of hot water for heating the apparatus, the electric heating bodies being distributed similarly to the heating water spirals and each group being regulated to the temperature desired by means of a thermostatic regulator.

After filling the apparatus, the heating device is adjusted to the temperature desired and a strong current of air, of dry steam or of an inert gas—preheated to the temperature of the apparatus—is passed through. This temperature is maintained during a period sufficient to obtain the desired loss of nicotine, which period has to be determined by tests previous to the operation proper.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Process for the reduction of the nicotine percentage contained in raw tobacco, intermediary products, and tobacco products ready for use, by heating same under the influence of a current of gas, air or dry steam, characterized in that, the tobacco products introduced into the apparatus, after having been brought previously to a state of complete dryness, are heated as rapidly as possible up to

the temperature at which a practically sufficient percentage of the nicotine salts will dissociate and volatilize, i.e. above 150° C., and are maintained at that temperature until the desired quantity of nicotine has been extracted and carried away as quickly as possible by a current of air, gas, or dry steam, preheated to the temperature of the apparatus and passed through at the highest possible speed.

2. A device for carrying out the process according to claim 1, which comprises a prismatic casing provided with a heat insulating lining, pans being located in stories one above the other in said casing and being axially passed through by a current of gas, air or dry steam, characterized thereby that the bottom of the container is fitted with an adjustable slitted sheet designed for uniformly distributing the air, gas or steam and that for the purpose of uniform heating, each pan is surrounded by a group of heating bodies arranged below and laterally of the container, so that each group may be heated and automatically regulated separately.

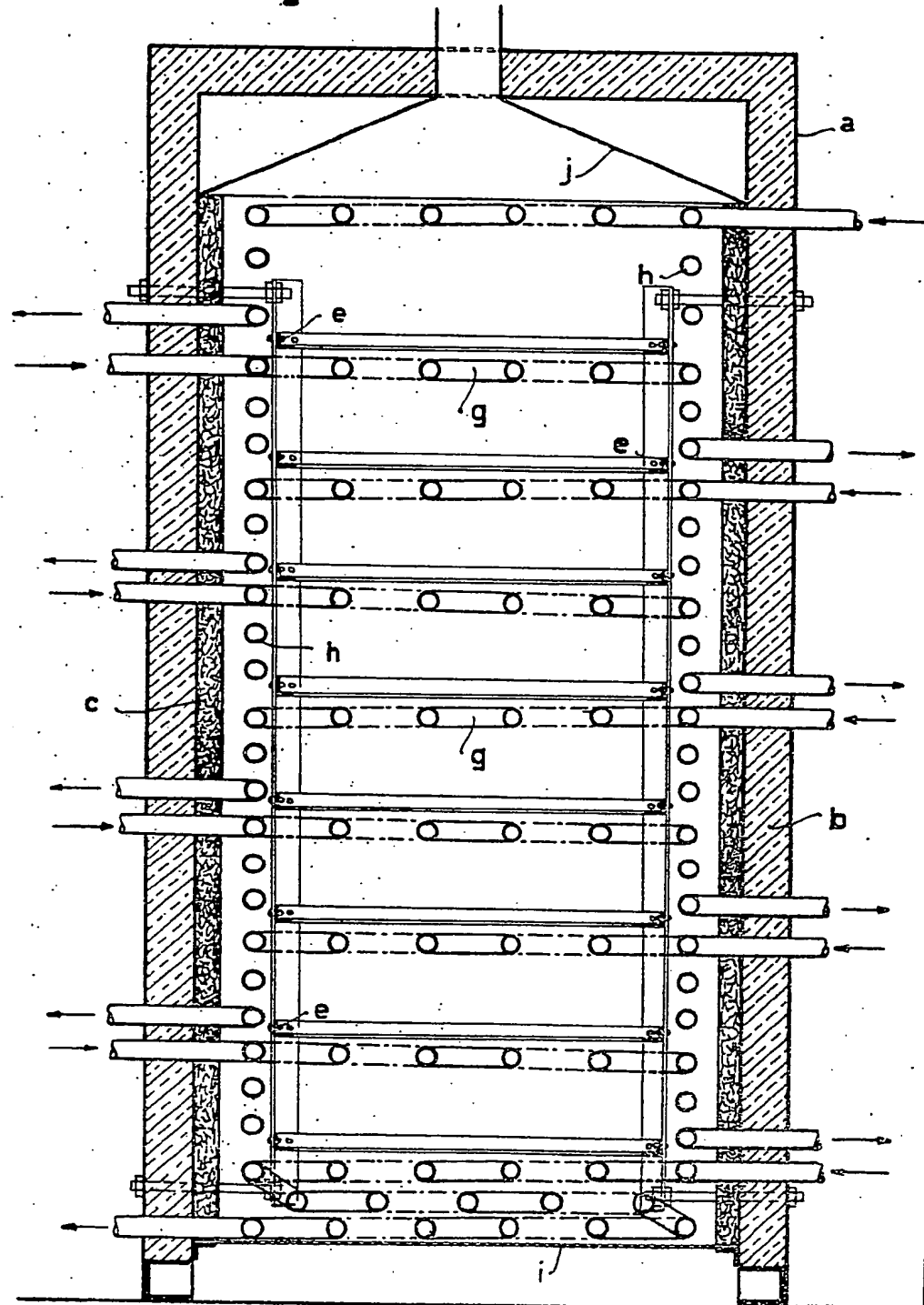
3. Method and apparatus for reducing the percentage of nicotine contained in raw tobaccos, in intermediary products and in tobacco products ready for use substantially as described with reference to the accompanying drawings.

Dated this 2nd day of May, 1928.

MEWBURN, ELLIS & Co.,

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Chartered Patent Agents.

Fig. 1



[This Drawing is a reproduction of the Original on a reduced scale.]

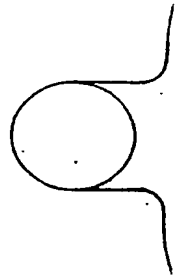


Fig. 2

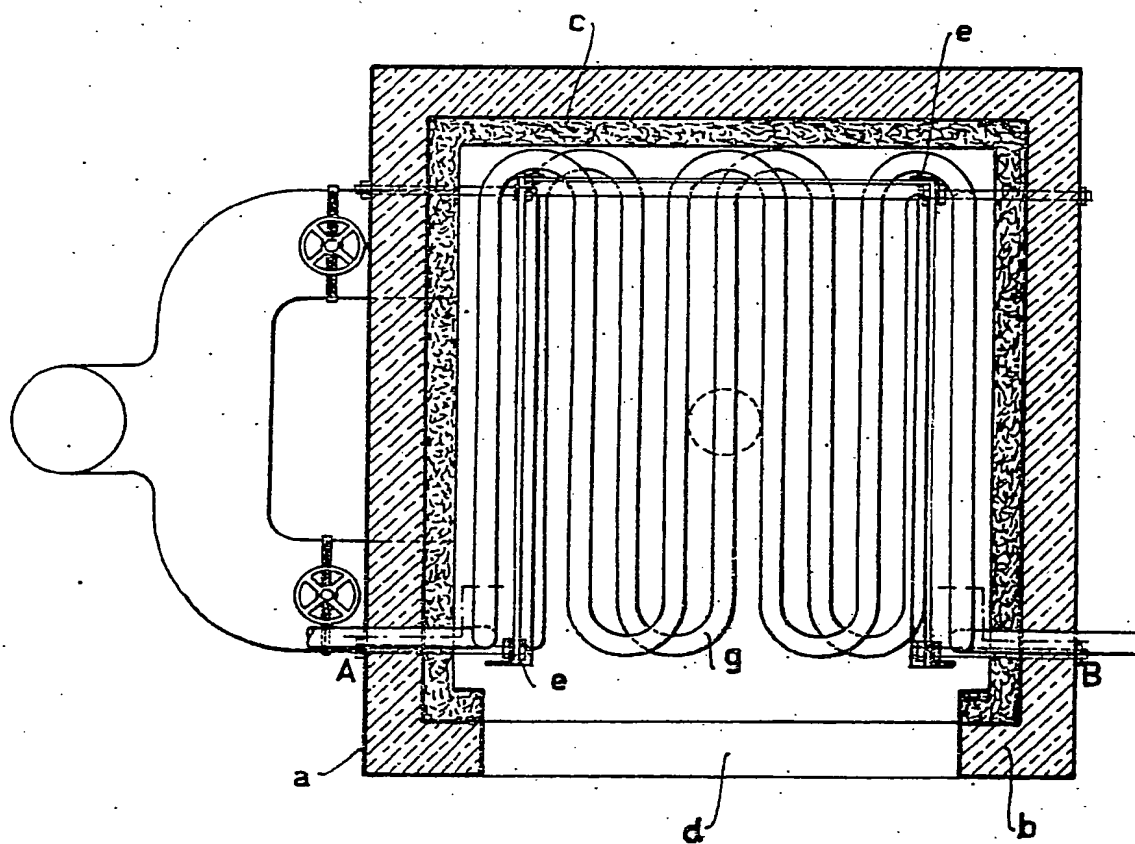
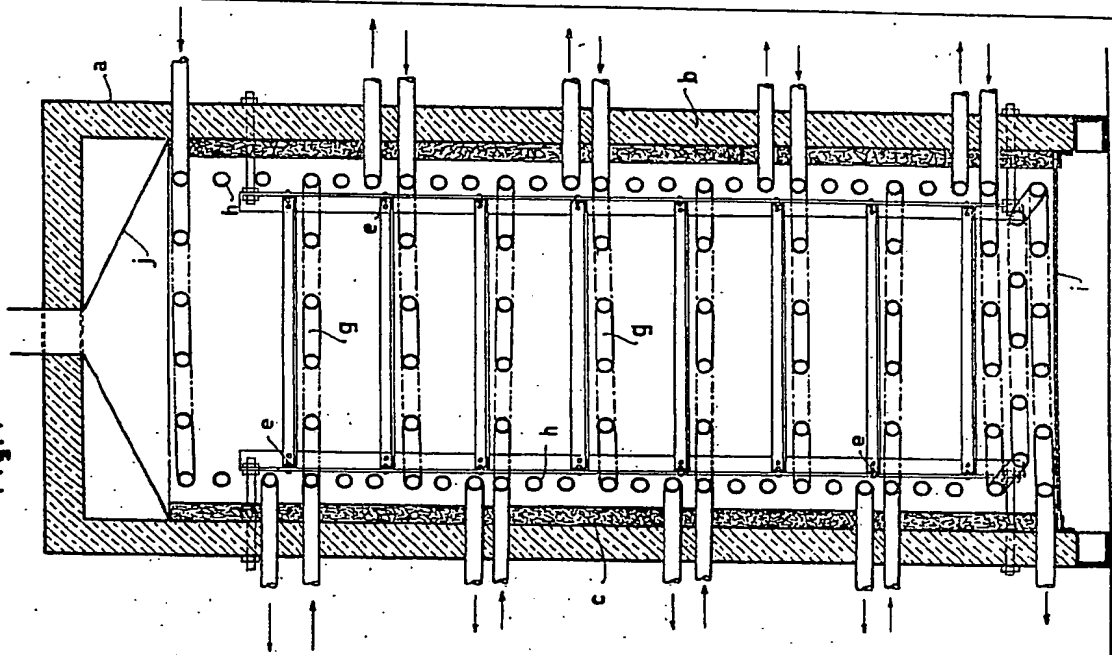


Fig. 1



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Fig. 2

